IN THE CLAIMS:

1. (currently amended)

A method for utilizing a modem to perform **[performing]** time domain reflectometry on a communication channel comprising:

connecting a modem to a communication channel;

generating an maximal length sequence signal utilizing the modem;

transmitting the sequence signal over the **[a]** communication channel;

receiving a reflection signal from the communication channel in response to the transmitting of the sequence signal;

correlating the reflection signal within the modem with the sequence signal to generate a correlated signal;

retrieving a template signal;

aligning the template signal and the correlated signal to determine a point of alignment;

subtracting the template signal from the correlated signal to remove near-end echo from the correlated signal;

measuring a time interval between the point of alignment and a subsequent peak in the correlated signal; and

multiplying the time interval by the rate of propagation of the sequence signal through the communication channel to obtain distance information regarding a line anomaly.

2. (original)

a12 cont'd

The method of Claim 1, wherein the template signal is a correlated version of a reflection created by a line interface.

3. (currently amended)

The method of Claim 1, wherein a subsequent peak in the reflection's **[reflections]** signal is caused by a bridge tap.

4. (original)

The method of Claim 1, wherein the communication channel comprises a twisted pair conductor.

5. (original)

The method of Claim 1, wherein transmitting the sequence signal is at a power level that does not introduce crosstalk into other communication channels.

6. (original)

The method of Claim 1, further including performing a circular rotation of the sequence signal to create a rotated sequence signal;

transmitting the rotated sequence signal over the communication channel;

receiving a rotated reflection signal;

correlating the rotated reflection signal with the rotated sequence signal to create a rotated correlated signal;

aligning the rotated correlated signal with the correlated signal; and

adding the rotated correlated signal to the correlated signal to reduce or remove correlation artifacts on the correlated signal.

7. (currently amended)

A method for utilizing a communication device to perform **[performing]** sequence time domain reflectometry comprising:

transmitting a sequence signal through a channel, the transmitting performed by a communication device;

receiving a reflected sequence signal, the receiving performed by the communication device; and

processing the reflected sequence signal to determine the location of at least one impedance mismatch on the channel, wherein the processing is performed by the communication device.

8. (original)

The method of Claim 7, wherein processing comprises correlation of the reflected sequence signal with the sequence signal.

9. (original)

The method of Claim 7, wherein processing comprises processing coefficients of a prediction filter.

Cl 12 Cont'd

10. (original)

The method of Claim 7, wherein at least one impedance mismatch is created by a load coil.

11. (original)

The method of Claim 7, wherein the sequence signal comprises a maximal length sequence.

12. (original)

The method of Claim 7, further including the step of removing unwanted reflections of the reflected sequence signal by subtracting a template signal from the reflected sequence signal or a processed version of the reflected sequence signal.

13. (original)

The method of Claim 12, further including the step of removing correlation artifacts from a correlated version of the reflected signal by combining a rotated correlated sequence signal with the correlated version of the reflected signal.

Claims 14-20 (withdrawn)

G12 Cont'd

21. (currently amended)

A method for processing a reflection within a communication device to determine the location of one or more line anomalies in a communication channel comprising:

correlating, within the communication device, the reflection with a sequence signal to create a correlated signal, the sequence signal comprising a sequence signal transmitted to generate **[generated]** the reflection;

locating, within the communication device, a signal component in the correlated signal indicative of an impedance mismatch;

calculating, within the communication device, a time period between the beginning of the reflection and the signal component; and

multiplying, within the communication device, the time period by one-half the rate of propagation of the reflection through the communication channel to determine the distance between one end of the communication channel and the impedance mismatch.

22. (original)

The method of Claim 21, wherein the channel comprises a twisted pair conductor configured for communication based on a digital subscriber line standard.

23. (original)

The method of Claim 21, wherein correlating comprises cross-correlation using a sliding tapped delay line.

24. (original)

The method of Claim 21, further including adding a correlated version of a rotated version of the sequence signal whereby adding reduces correlation artifacts of the correlated signal.

25. (original)

The method of Claim 21, wherein the method is at least partially embodied in software in a modem.

26. (currently amended)

A method for processing a reflection signal within a communication modem generated by transmission of a test signal onto a channel to determine a location of a line anomaly comprising:

correlating the reflection with the test signal to create a correlated reflection signal, wherein the test signal is a signal that has autocorrelation properties;

analyzing the correlated reflection signal to determine a time difference between transmission of the test signal and a point of correlation; and

multiplying the time difference by the rate of propagation of the test signal through the channel to obtain information regarding the location of a line anomaly.

27. (original)

a12 cont'd

The method of Claim 26, wherein analyzing comprises determining a time difference between receipt of near-end echo of the correlated reflection signal and a peak in the correlated reflection signal.

28. (original)

The method of Claim 26, wherein the method is performed by an integrated circuit that is part of a data communication device.

29. (original)

The method of Claim 26, wherein the test signal is a sequence signal with good autocorrelation properties.

30. (original)

The method of Claim 26, further including:

subtracting a template signal from the reflection signal or the correlated reflection signal to more clearly define a point of correlation; and

adding a rotated signal to the correlated reflection signal to reduce correlation artifacts, wherein the rotated signal comprises a signal resulting from correlating a rotated test signal with a reflection of a rotated test signal.

Claims 31-39 (withdrawn)

40. (currently amended)

A digital subscriber line modem **[system]** for performing sequence time domain reflectometry to determine the location of impedance mismatches on a channel being configured to communicate data using a digital subscriber line standard, the **[system]** digital subscriber line modem comprising :

a sequence generator configured to generate a sequence signal, wherein the sequence generator is further configured to operate as part of the digital subscriber line modem during communication of data using a digital subscriber line standard;

a transmitter configured to transmit the sequence signal on a channel causing the sequence signal to propagate through the channel, the channel being analyzed to determine the location of impedance mismatches that may affect data transmission, wherein the transmitter is further configured to operate as part of the digital subscriber line modem during communication of data using a digital subscriber line standard;

a receiver configured to receive one or more reflections that result from the sequence signal encountering impedance mismatches as it propagates through the channel, wherein the receiver is further configured to operate as part of the digital subscriber line modem during communication of data using a digital subscriber line standard;

a correlator configured to correlate the one or more reflections with the sequence signal to generate an output having one or more peaks;

a processor, that is also configured to perform processing to achieve communication using a digital subscriber line standard, the processor further configured to:

time the period between a beginning of the sequence signal transmission by the transmitter and at least one of the one or more peaks; and

calculate a value corresponding to a channel length between the system and an impedance mismatch.

41. (currently amended)

The system of Claim 40, wherein the system is embodied in conjunction with a communication device configured to communicate data using a digital subscriber line standard.

42. (original)

The system of Claim 40, wherein the sequence generator comprises a tapped delay line.

43. (original)

The system of Claim 40, wherein the channel comprises a channel selected from the group consisting of twisted pair conductor and fiber optic cable.

44. (original)

The system of Claim 40, wherein the correlator comprises a tapped delay line.

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45. (currently amended)

A communication device configured to perform **[system for performing]** time domain reflectometry on a communication channel to provide information regarding a location of a line anomaly comprising:

a scrambler **[sequence generator]** configured to generate a sequence signal;

a communication device transmitter in communication with the sequence generator and configured to transmit the sequence signal onto the channel;

a communication device receiver configured to receive signals from the channel and provide the signals to a reflection processor; and

a reflection processor configured to process the reflection to determine a location of a line anomaly.

46. (original)

The system for Claim 45, wherein the communication channel comprises twisted pair wire.

47. (original)

The system for Claim 45, wherein the peak voltage of the sequence signal is less than 18 volts.

48. (original)

The system for Claim 45, wherein the reflection processor includes a correlation unit.

9/12 Cont'd

49. (original)

The system for Claim 45, wherein the system is integrated with a data communication device.

50. (currently amended)

A system, configured as part of a communication device, for processing a reflection signal received in response to transmission by a communication device of a sequence signal over a channel comprising:

a correlator, comprising a sliding tapped delay line that is utilized by the communication device during a communication session, configured to correlate the reflection signal with the sequence signal to generate a correlated signal;

a peak detector configured receive the correlated signal and detect a start of the correlation signal and a subsequent peak; and

a timer configured to determine a difference in time between a start of the correlation signal and the subsequent peak, wherein the difference in time can be related to a distance between an end of the channel and a line anomaly.

51. (original)

The system of Claim 50, wherein the start of the correlation signal is defined by a peak in the correlated signal caused by a reflection received from a line interface.

G 12 Contd

52. (original)

The system of Claim 50, wherein the peak detector comprises a comparator and a register in which a current peak value is stored.

53. (original)

The system of Claim 50, wherein the timer comprises a counter configured to count the samples between the start of the correlation signal and a subsequent peak caused by the echo from a line anomaly.

54. (original)

The system of Claim 50, wherein the channel comprises a twisted pair conductor and the sequence signal does not generate disruptive crosstalk in adjacent pairs in a binder that also contains the twisted pair conductor.

Claims 55-59 (withdrawn)

60. (currently amended)

A modem configured to process **[An apparatus for processing]** a reflection signal to determine a location of a line anomaly comprising:

means for receiving a reflection signal from a line;

means for cross correlating the reflection signal to create a correlated reflection signal; and

means for analyzing the correlated reflection signal to determine the location of one or more line anomalies associated with the line.

61. (original)

The apparatus of Claim 60, wherein one or more line anomalies comprise one or more points of impedance mismatch.

62. (original)

The apparatus of Claim 60, further including means for subtracting a template signal from the correlated reflection signal.

63. (original)

The apparatus of Claim 60, further including means for adding a correlated rotated reflection signal to the correlated reflection signal.

64. (currently amended)

The apparatus of Claim 60, wherein the means for correlating and the means for analyzing comprise **[comprises]** a processor and processor readable code.

a 12 Cont'd

65. (currently amended)

A computer program product comprising a computer useable medium having computer program logic recorded thereon for performing time domain reflectometry analysis, the computer useable medium part of a communication device, the computer program product comprising:

computer program code logic configured to receive one or more reflections of a sequence signal that are caused by the sequence signal encountering impedance mismatches as it propagates through a channel;

computer program code logic configured to correlate the one or more reflections with the sequence signal;

computer program code logic configured to process the correlation to determine a time difference value between transmission of the sequence signal and receipt of one or more reflections; and

computer program code logic configured to process the time difference value with regard to the rate of propagation of the sequence signal and the reflection through the channel to determine information regarding a location of the impedance mismatch, wherein the computer program code logic is located in the communication device.

66. (original)

The computer program product of Claim 65, wherein the sequence signal comprises a maximal length sequence.

a 12 Cont.d

67. (currently amended)

The computer program product of Claim 65, further including a computer program product configured to generate a sequence signal, the computer program product comprising:

computer program code logic configured to specify a sequence;

computer program code logic configured to recall the sequence signal from memory; and

computer program code logic configured to provide the sequence signal to a transmitter.

68. (original)

The computer program product of Claim 65, wherein the computer program code logic configured to process the correlation comprises a compare routine and a counter.

69. (original)

The computer program product of Claim 65, further including computer program code logic configured to recall a template from memory and subtract the template from the correlated signal to remove unwanted portions of the reflection signal.

70. (currently amended)

The computer program product of Claim 65, further comprising:

computer program code logic configured to modify the sequence signal;

a13 Cont.

computer program code logic configured to initiate transmission of the modified sequence signal over the channel;

computer program code logic configured to receive a modified reflection caused by the modified sequence signal;

computer program code logic configured to correlate **[correlated]** the modified reflection with the modified sequence signal to create a modified correlation; and

computer program code logic configured to combine the correlation and the modified correlation.